

**Implementation Activity:**    **Develop and apply methods for assessing fire safety in nuclear facilities (RES/DRASP)**

**Primary FY 04-09 Strategic Plan Goal:**    Ensure that NRC actions are effective, efficient, realistic, and timely.

**Strategy 1:**    Use state-of-art methods and risk insights to improve the effectiveness and realism of NRC actions.

**Strategy 4:**    Use realistic, conservative safety-related research programs to resolve safety-related issues.

**Secondary FY 04-09 Strategic Plan Goal:** Ensure protection of public health and safety and the environment.

**Strategy 3:**    Use sound science and state-of-the-art methods to establish risk-informed and, where appropriate, performance-based regulations.

**Primary Priority:**    High

**Secondary Priority:** Medium

The development of risk-informed, performance-based fire standards and regulations requires a sound understanding of fire and its contribution to power plant risk. A fire research program has been developed and is being implemented to address the complex issues associated with fire risk and to support risk-informed changes to standards and regulations. Also, RES is performing specialized testing to support other NRC program offices.

The staff worked with the National Fire Protection Association (NFPA) to develop a performance-based, risk-informed fire protection standard (NFPA 805) for nuclear power plants. NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," was issued in January 2001 and serves as the basis for the rule, 10 CFR 50.48(c). RES and Electric Power Research Institute (EPRI) have provided much of the technical basis for this implementation by developing tools critical to performing fire PRA and performance-based fire assessments. RES is conducting activities in this area by request of formal NRR User Need.

One of the tools, NUREG-1824 (EPRI 1011999), "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," was published in May 2007. The development of this report was a joint project with EPRI and the National Institute of Standards and Technology (NIST). This provides fire model users with confidence in model results. In addition, fire models are required to be verified and validated when used under the new 10CFR50.48(c) (NFPA 805). The objective of the project was to gain an understanding of the predictive capabilities of fire models used in NPP scenarios.

RES and EPRI conducted a detailed, hands-on fire PRA training course in July and August of 2007. This training is based upon the jointly produced document, NUREG/CR-6850 (EPRI 1011989) "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities." Approximately 100 representatives from NRC, including NRR, RES, and the Regions, and industry, as well as from outside the U.S., attended concentrated training in the field. These participants provided highly favorable feedback on the training. RES and EPRI had conducted more general workshops in fire PRA in 2005 and 2006, and the detailed training had been requested by internal and external stakeholders at those general workshops.

RES is providing support to NRR by attending observation visits at the two pilot plants transitioning to 10 CFR 50.48 (c), and by reviewing technical materials for those plants' transition. RES's role in these visits and reviews is to ensure that its technical documents are implemented properly, as well as to collect insights relevant to these technologies. RES will continue to support observation visits and reviews of pilot plant material in 2008.

The fire risk standard is a part of the Commission's phased approach to PRA quality (SECY-04-0118), and will support implementation of the risk-informed, performance-based rule endorsing NFPA 805. This standard developed under the auspices of the American Nuclear Society (ANS) provides categories of fire PRA quality which will be relevant to the application of fire PRA. RES has provided substantial support to the Committee for drafting and reviewing the Standard. RES has also integrated the agency's comments on three public issuances of draft versions of this Standard, and provided those comments to the ANS. The public review and public comment period of this third draft ends in September 2007. RES plans to initiate the agency review of the Fire PRA Standard, as well as the associated NEI Peer Review Guidance, as a part of its formal Regulatory Guide endorsement.

RES is supporting the NRR Circuit Analysis Resolution Program. RES provided the technical basis for RIS 2004-03. This RIS identified circuit issues to be inspected and other lower risk issues that possibly should be subjected to inspection but which needed additional tests and analyses for final determination. RES provided these additional tests and analyses with the Cable Response to Live Fire (CAROLFIRE) program, which was performed in 2006. Probability values relevant to circuit analyses, which have been developed from this testing and analysis program, will be incorporated into the fire risk analysis process in 2008, following publication of the final CAROLFIRE reports in early 2008.

Selected Major Milestones and Schedules				
Major Milestones	Original Target Date	Revised Date	Completion Date	NRC Responsibility
Publish report on fire risk requantification, NUREG/CR-6850 (contingent on EPRI)	September 2005		September 2005	RES/DRASP
Issue draft NUREG-1824 for public comment period	October 2005		January 2006	RES/DRASP
Issue draft ANS fire PRA standard for public comment	September 2005	June 2006	April 2006	RES/DRASP
Conduct RES/EPRI fire PRA workshop	June 2006		May 2006	RES/DRASP
Conduct RES/EPRI detailed fire PRA course (2 sessions)	August 2007		July 2007 August 2007	RES/ <u>DFERR</u>
Issue Final fire model verification and validation report NUREG-1824	January 2007		May 2007	RES/DRASP
Publish final CAROLFIRE NUREG/CR reports	March 2008			RES/DFERR